

10/08859

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SEQUENCE LISTING

<110> Japan Science and Technology Corporation

<120> Method for Producing an Antibody with Genetic Immunization

<130> 01F033PCT

<140> PCT/JP01/06371

<141> 2001-07-24

<150> JP2000-222743

<151> 2000-07-24

<150> JP2000-254407

<151> 2000-08-24

<160> 13

<170> Patentin Ver. 2.1

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aatcaaaaacg ctgattaaaa gaagcacggat atg atg acc aaa cat aaa aag tgt 174

Met Met Thr Lys His Lys Lys Cys

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5

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10

15

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gtt aaa cta act cga gat tct cag agt tta tgc ccc tat gat tgg att 270
Val Lys Leu Thr Arg Asp Ser Gln Ser Leu Cys Pro Tyr Asp Trp Ile

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30

35

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 Ile Asp Asn Ile Glu Glu Met Asn Phe Leu Arg Arg Tyr Lys Cys Ser
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 Ser Asp His Trp Ile Gly Leu Lys Met Ala Lys Asn Arg Thr Gly Gln
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 Trp Val Asp Gly Ala Thr Phe Thr Lys Ser Phe Gly Met Arg Gly Ser
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 125 130 135

tac acc gaa aga aaa tgg att tgc agg aaa aga ata cac taa 600
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agtactttt taattaaaca aagttcgagt tttgtac 697

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 Ala Val Glu Ala Thr Gly Glu Lys Val Leu Arg Tyr Glu Thr Phe Ile
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agt gac gtg ctg cag cgg gac ttg cga aag gtg ctg gac cat cga gac 149
 Ser Asp Val Leu Gln Arg Asp Leu Arg Lys Val Leu Asp His Arg Asp
 25 30 35 40

aag gta tat gag cag ctg gcc aaa tac ctt caa ctg aga aat gtc att 197
 Lys Val Tyr Glu Gln Leu Ala Lys Tyr Leu Gln Leu Arg Asn Val Ile
 45 50 55

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 Ile Tyr Val Ala Leu Gly Tyr Gly Phe Phe Leu Glu Leu Thr Leu Ala
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 125 130 135

atg ttg cta gag ggg ctt aga gaa cta caa ggc ctg cag aat ttc cca 485
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 Arg Lys Val Leu Asp His Arg Asp Lys Val Tyr Glu Gln Leu Ala Lys
 35 40 45
 Tyr Leu Gln Leu Arg Asn Val Ile Glu Arg Leu Gln Glu Ala Lys His
 50 55 60

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Ser	Glu	Leu	Tyr	Met	Gln	Val	Asp	Leu	Gly	Cys	Asn	Phe	Phe	Val	Asp
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Thr	Val	Val	Pro	Asp	Thr	Ser	Arg	Ile	Tyr	Val	Ala	Leu	Gly	Tyr	Gly
					85				90				95		
Phe	Phe	Leu	Glu	Leu	Thr	Leu	Ala	Glu	Ala	Leu	Lys	Phe	Ile	Asp	Arg
					100				105			110			
Lys	Ser	Ser	Leu	Leu	Thr	Glu	Leu	Ser	Asn	Ser	Leu	Thr	Lys	Asp	Ser
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Met	Asn	Ile	Lys	Ala	His	Ile	His	Met	Leu	Leu	Glu	Gly	Leu	Arg	Glu
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<212> DNA

<213> Artificial Sequence

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<223> Artificial Sequence: Synthesized oligonucleotide

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cag cag ctg ggc ctc ctg ggg tgt ctt ggc cat ggc gcc ctg gtg ctg 99
 Gin Gin Leu Gly Leu Leu Gly Cys Leu Gly His Gly Ala Leu Val Leu
 10 15 20 25

caa ctc ctc tcc ttc atg ctc ttg gct ggg gtc ctg gtg gcc atc ctt 147
 Gin Leu Leu Ser Phe Met Leu Leu Ala Gly Val Leu Val Ala Ile Leu
 30 35 40

gtc caa gtg tcc aag gtc ccc agc tcc cta agt cag gaa caa tcc gag 195
 Val Gln Val Ser Lys Val Pro Ser Ser Leu Ser Gln Glu Gln Ser Glu
 45 50 55

caa gac gca atc tac cag aac ctg acc cag ctt aaa gct gca gtg ggt 243
 Gln Asp Ala Ile Tyr Gln Asn Leu Thr Gln Leu Lys Ala Ala Val Gly
 60 65 70

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gag ctc tca gag aaa tcc aag ctg cag gag atc tac cag gag ctg acc	291
Glu Leu Ser Glu Lys Ser Lys Leu Gln Glu Ile Tyr Gln Glu Leu Thr	
75 80	85
cag ctg aag gct gca gtg ggt gag ttg cca gag aaa tcc aag ctg cag	339
Gln Leu Lys Ala Ala Val Gly Glu Leu Pro Glu Lys Ser Lys Leu Gln	
90 95	100 105
gag atc tac cag gag ctg acc cgg ctg aag gct gca gtg ggt gag ttg	387
Glu Ile Tyr Gln Glu Leu Thr Arg Leu Lys Ala Ala Val Gly Glu Leu	
110 115	120
cca gag aaa tcc aag ctg cag gag atc tac cag gag ctg acc cgg ctg	435
Pro Glu Lys Ser Lys Leu Gln Glu Ile Tyr Gln Glu Leu Thr Arg Leu	
125 130	135
aag gct gca gtg ggt gag ttg cca gag aaa tcc aag ctg cag gag atc	483
Lys Ala Ala Val Gly Glu Leu Pro Glu Lys Ser Lys Leu Gln Glu Ile	
140 145	150
tac cag gag ctg acc cgg ctg aag gct gca gtg ggt gag ttg cca gag	531
Tyr Gln Glu Leu Thr Arg Leu Lys Ala Ala Val Gly Glu Leu Pro Glu	
155 160	165
aaa tcc aag ctg cag gag atc tac cag gag ctg acg gag ctg aag gct	579
Lys Ser Lys Leu Gln Glu Ile Tyr Gln Glu Leu Thr Glu Leu Lys Ala	
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Ala Val Gly Glu Leu Pro Glu Lys Ser Lys Leu Gln Glu Ile Tyr Gln	
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gag ctg acc cag ctg aag gct gca gtg ggt gag ttg cca gac cag tcc	675
Glu Leu Thr Gln Leu Lys Ala Ala Val Gly Glu Leu Pro Asp Gln Ser	
205 210	215
aag cag cag caa atc tat caa gaa ctg acc gat ttg aag act gca ttt	723
Lys Gln Gln Gln Ile Tyr Gln Glu Leu Thr Asp Leu Lys Thr Ala Phe	
220 225	230
gaa cgc ctg tgc cgc cac tgt ccc aag gac tgg aca ttc ttc caa gga	771
Glu Arg Leu Cys Arg His Cys Pro Lys Asp Trp Thr Phe Phe Gln Gly	
235 240	245

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Asn Cys Tyr Phe Met Ser Asn Ser Gln Arg Asn Trp His Asp Ser Val
250          255          260          265

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acc gcc tgc cag gaa gtg agg gcc cag ctc gtc gta atc aaa act gct 867
Thr Ala Cys Glu Val Arg Ala Gln Leu Val Val Ile Lys Thr Ala
270 275 280

gag gag cag ctt cca gcg gta ctg gaa cag tgg aga acc caa caa tag 915
Glu Glu Gln Leu Pro Ala Val Leu Glu Gln Trp Arg Thr Gln Gln
285 290 295

cggaatgaa gactgtgcgg aatttagtgg cagtggtgg aacgacaatc gatgtgacgt 975
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<222> (118).. (1236)

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atg aag tat ctc cgg cac cgg cgg ccc aat gcc acc ctc att ctg gcc
Met Lys Tyr Leu Arg His Arg Arg Pro Asn Ala Thr Leu Ile Leu Ala
1 5 10 15atc ggc gct ttc acc ctc ctc ttc agt ctg cta gtg tca cca ccc 213
Ile Gly Ala Phe Thr Leu Leu Leu Phe Ser Leu Leu Val Ser Pro Pro
20 25 30acc tgc aag gtc cag gag cag cca ccg ggc atc ccc gag gcc ctg gcc 261
Thr Cys Lys Val Gln Glu Gln Pro Pro Ala Ile Pro Glu Ala Leu Ala
35 40 45tgg ccc act cca ccc acc cgc cca gcc ccg gcc tgc cat gcc aac 309
Trp Pro Thr Pro Pro Thr Arg Pro Ala Pro Ala Pro Cys His Ala Asn
50 55 60acc tct atg gtc acc cac ccg gac ttc gcc acg cag ccg cag cac gtt 357
Thr Ser Met Val Thr His Pro Asp Phe Ala Thr Gln Pro Gln His Val
65 70 75 80cag aac ttc ctc ctg tac aga cac tgc ccg cac ttt ccc ctg ctg cag 405
Gln Asn Phe Leu Leu Tyr Arg His Cys Arg His Phe Pro Leu Leu Gln
85 90 95gac gtg ccc ccc tct aag tgc gcg cag ccg gtc ttc ctg ctg ctg gtg 453
Asp Val Pro Pro Ser Lys Cys Ala Gln Pro Val Phe Leu Leu Val
100 105 110atc aag tcc tcc cct agc aac tat gtg ccg ccg gag ctg ctg ctg cgg ccc 501
Ile Lys Ser Pro Ser Asn Tyr Val Arg Arg Glu Leu Leu Arg Arg
115 120 125acg tgg ggc ccg gag ccg aag gta cgg ggt ttg cag ctg ccg ctc ctc 549
Thr Trp Gly Arg Glu Arg Lys Val Arg Gly Leu Gln Leu Arg Leu Leu
130 135 140

ttc ctg gtg ggc aca gcc tcc aac ccg cac gag gcc ccg aag gtc aac 597

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Phe Leu Val Gly Thr Ala Ser Asn Pro His Glu Ala Arg Lys Val Asn			
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Arg Leu Leu Glu Leu Glu Ala Gln Thr His Gly Asp Ile Leu Gln Trp			
165	170	175	
gac ttc cac gac tcc ttc aac ctc acg ctc aag cag gag gtc ctg ttc			693
Asp Phe His Asp Ser Phe Phe Asn Leu Thr Leu Lys Gln Val Leu Phe			
180	185	190	
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Leu Gln Trp Gln Glu Thr Arg Cys Ala Asn Ala Ser Phe Val Leu Asn			
195	200	205	
ggg gat gat gac gtc ttt gca cac aca gac aac atg gtc ttc tac ctg			789
Gly Asp Asp Asp Val Phe Ala His Thr Asp Asn Met Val Phe Tyr Leu			
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cag gac cat gac cct egg cgc cac ctc ttc gtg ggg caa ctg atc caa			837
Gln Asp His Asp Pro Gly Arg His Leu Phe Val Gly Gln Leu Ile Gln			
225	230	235	240
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Asn Val Gly Pro Ile Arg Ala Phe Trp Ser Lys Tyr Tyr Val Pro Glu			
245	250	255	
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Val Val Thr Gln Asn Glu Arg Tyr Pro Pro Tyr Cys Gly Gly Gly			
260	265	270	
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Val Leu Asp Ile Phe Pro Ile Asp Asp Val Phe Leu Gly Met Cys Leu			
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Glu Leu Glu Gly Leu Lys Pro Ala Ser His Ser Gly Ile Arg Thr Ser			
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325

330

335

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 340 345 350

ctc atg tgg gat gcg ctg aac cag ccc aac ctc acc tgc ggc aat cag 1221
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 355 360 365

aca cag atc tac tga gtcagcatca gggccccag cctctggct cctgtttcca 1276
 Thr Gin Ile Tyr
 370

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 Met Lys Gly Trp Gly Trp Leu Ala Leu
 1 5
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 Leu Leu Gly Ala Leu Leu Gly Thr Ala Trp Ala Arg Arg Ser Gln Asp
 10 15 20 25
 5
 ctc cac tgt gga gca tgc agg gct ctg gtg gat gaa cta gaa tgg gaa 267
 Leu His Cys Gly Ala Cys Arg Ala Leu Val Asp Glu Leu Glu Trp Glu
 30 35 40
 att gcc cag gtg gac ccc aag aag acc att cag atg gga tct ttc cgg 315
 Ile Ala Gln Val Asp Pro Lys Lys Thr Ile Gln Met Gly Ser Phe Arg
 45 50 55
 atc aat cca gat ggc agc cag tca gtg gtg gag gtg cct tat gcc cgc 363
 Ile Asn Pro Asp Gly Ser Gln Ser Val Val Glu Val Pro Tyr Ala Arg
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 Ser Glu Ala His Leu Thr Glu Leu Leu Glu Glu Ile Cys Asp Arg Met
 75 80 85
 aag gag tat ggg gaa cag att gat cct tcc acc cat cgc aag aac tac 459
 Lys Glu Tyr Gly Glu Gln Ile Asp Pro Ser Thr His Arg Lys Asn Tyr
 90 95 100 105
 gta cgt gta gtg ggc cgg aat gga gaa tcc agt gaa ctg gac cta caa 507

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Val Arg Val Val Gly Arg Asn Gly Glu Ser Ser Glu Leu Asp Leu Gln
 110 115 120

ggc atc cga atc gac tca gat att agc ggc acc ctc aag ttt gcg tgt 555
 Gly Ile Arg Ile Asp Ser Asp Ile Ser Gly Thr Leu Lys Phe Ala Cys
 125 130 135

gag agc att gtg gag gaa tac gag gat gaa ctc att gaa ttc ttt tcc 603
 Glu Ser Ile Val Glu Glu Tyr Glu Asp Glu Leu Ile Glu Phe Phe Ser
 140 145 150

cga gag gct gac aat gtt aaa gac aaa ctt tgc agt aag cga aca gat 651
 Arg Glu Ala Asp Asn Val Lys Asp Lys Leu Cys Ser Lys Arg Thr Asp
 155 160 165

ctt tgt gac cat gcc ctg cac ata tcg cat gat gag cta tga 693
 Leu Cys Asp His Ala Leu His Ile Ser His Asp Glu Leu
 170 175 180

accactggag cagccccacac tggcttgatg gatcacccccc aggagggaa aatggtggca 753

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C 814

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 Met Arg Arg Leu Leu Ile Pro Leu Ala Leu Trp Leu Gly
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gcg gtg ggc gtg ggc gtc gcc gag ctc acg gaa gcc cag cgc cgg ggc 159
 Ala Val Gly Val Gly Val Ala Glu Leu Thr Glu Ala Gln Arg Arg Gly
 15 20 25

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ctg cag gtg gcc ctg gag gaa ttt cac aag cac ccg ccc gtg cag tgg	207
Leu Gln Val Ala Leu Glu Glu Phe His Lys His Pro Pro Val Gln Trp	
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gcc ttc cag gag acc agt gtg gag agc gcc gtg gac acg ccc ttc cca	255
Ala Phe Gln Glu Thr Ser Val Glu Ser Ala Val Asp Thr Pro Phe Pro	
50 55 60	
gct gga ata ttt gtg agg ctg gaa ttt aag ctg cag cag aca agc tgc	303
Ala Gly Ile Phe Val Arg Leu Glu Phe Lys Leu Gln Gln Thr Ser Cys	
65 70 75	
cgg aag agg gac tgg aag aaa ccc gag tgc aaa gtc agg ccc aat ggg	351
Arg Lys Arg Asp Trp Lys Lys Pro Glu Cys Lys Val Arg Pro Asn Gly	
80 85 90	
agg aaa cgg aaa tgc ctg gcc tgc atc aaa ctg ggc tct gag gac aaa	399
Arg Lys Arg Lys Cys Leu Ala Cys Ile Lys Leu Gly Ser Glu Asp Lys	
95 100 105	
gtt ctg ggc cgg ttg gtc cac tgc ccc ata gag acc caa gtt ctg cgg	447
Val Leu Gly Arg Leu Val His Cys Pro Ile Glu Thr Gln Val Leu Arg	
110 115 120 125	
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Glu Ala Glu Glu His Gln Glu Thr Gln Cys Leu Arg Val Gln Arg Ala	
130 135 140	
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Gly Glu Asp Pro His Ser Phe Tyr Phe Pro Gly Gln Phe Ala Phe Ser	
145 150 155	
aag gcc ctg ccc cgc agc taa gccagcactg agctgcgtgg tgccctccagg	594
Lys Ala Leu Pro Arg Ser	
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220

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〈222〉 (105) . . (1436)

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Met Arg Leu Thr
1

cgg aag cggttcgc tttctt atcgccctgtac tac tgc cta ttcc 164
 Arg Lys Arg Leu Cys Ser Phe Leu Ile Ala Leu Tyr Cys Leu Phe Ser
 5 10 15 20

ctc tac gct gcc tac cac gtc ttc ttc ggg cgc cgc cgc cag gcg ccg 212
 Leu Tyr Ala Ala Tyr His Val Phe Phe Gly Arg Arg Arg Gln Ala Pro
 25 30 35

gcc ggg tcc ccg cgg ggc ctc agg aag ggg gcg gcc ccc gcg cgg gag 260
Ala Gly Ser Pro Arg Gly Leu Arg Lys Gly Ala Ala Pro Ala Arg Glu
40 45 50

aga cgc ggc cga gaa cag tcc act ttg gaa agt gaa gaa tgg aat cct 308
Arg Arg Gly Arg Glu Gln Ser Thr Leu Glu Ser Glu Glu Trp Asn Pro
55 60 65

tgg gaa gga gat gaa aaa aat gag caa caa cac aga ttt aaa act agc 356
Trp Glu Gly Asp Glu Lys Asn Glu Gln Gln His Arg Phe Lys Thr Ser
70 75 80

ctt caa ata tta gat aaa tcc acg aaa gga aaa aca gat ctc agt gta 404
Leu Gln Ile Leu Asp Lys Ser Thr Lys Gly Lys Thr Asp Leu Ser Val
85 90 95 100

caa atc tgg ggc aaa gct gcc att ggc ttg tat ctc tgg gag cat att 452
Gin Ile Trp Gly Lys Ala Ala Ile Gly Leu Tyr Leu Trp Glu His Ile
105 110 115

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120 125 130

16/17

gga aag tca atc gta gga aga aca cac tac agc ttc atc act ggt cca	548																																																																																				
Gly Lys Ser Ile Val Gly Arg Thr Gln Tyr Ser Phe Thr Gly Pro																																																																																					
135	140	145		gct gta ata cca ggg tac ttc tcc gtt gat gtg aat aat gtg gta ctc	596	Ala Val Ile Pro Gly Tyr Phe Ser Val Asp Val Asn Asn Val Val Leu		150	155	160		att tta aat gga aga gaa aaa gca aag atc ttt tat gcc acc cag tgg	644	Ile Leu Asn Gly Arg Glu Lys Ala Lys Ile Phe Tyr Ala Thr Gln Trp		165	170	175	180	tta ctt tat gca caa aat tta gtg caa att caa aaa ctc cag cat ctt	692	Leu Leu Tyr Ala Gln Asn Leu Val Gln Ile Gln Lys Leu Gln His Leu		185	190	195		gct gtt gtt ttg ctc gga aat gaa cat tgt gat aat gag tgg ata aac	740	Ala Val Val Leu Leu Gly Asn Glu His Cys Asp Asn Glu Trp Ile Asn		200	205	210		cca ttc ctc aaa aga aat gga ggc ttc gtg gag ctg ctt ttc ata ata	788	Pro Phe Leu Lys Arg Asn Gly Gly Phe Val Glu Leu Leu Phe Ile Ile		215	220	225		tat gac agc ccc tgg att aat gac gtg gat gtt ttt cag tgg cct tta	836	Tyr Asp Ser Pro Trp Ile Asn Asp Val Asp Val Phe Gln Trp Pro Leu		230	235	240		gga gta gca aca tac agg aat ttt cct gtg gtg gag gca agt tgg tca	884	Gly Val Ala Thr Tyr Arg Asn Phe Pro Val Val Glu Ala Ser Trp Ser		245	250	255	260	atg ctg cat gat gag agg cca tat tta tgt aat ttc tta gga acg att	932	Met Leu His Asp Glu Arg Pro Tyr Leu Cys Asn Phe Leu Gly Thr Ile		265	270	275		tat gaa aat tca tcc aga cag gca cta atg aac att ttg aaa aaa gat	980	Tyr Glu Asn Ser Ser Arg Gln Ala Leu Met Asn Ile Leu Lys Lys Asp		280	285	290		ggg aac gat aag ctt tgt tgg gtt tca gca aga gaa cac tgg cag cct	1028	Gly Asn Asp Lys Leu Cys Trp Val Ser Ala Arg Glu His Trp Gln Pro		295	300	305		cag gaa aca aat gaa agt ctt aag aat tac caa gat gcc ttg ctt cag	1076
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gct gta ata cca ggg tac ttc tcc gtt gat gtg aat aat gtg gta ctc	596																																																																																				
Ala Val Ile Pro Gly Tyr Phe Ser Val Asp Val Asn Asn Val Val Leu																																																																																					
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Ile Leu Asn Gly Arg Glu Lys Ala Lys Ile Phe Tyr Ala Thr Gln Trp																																																																																					
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175	180																																																																																				
tta ctt tat gca caa aat tta gtg caa att caa aaa ctc cag cat ctt	692																																																																																				
Leu Leu Tyr Ala Gln Asn Leu Val Gln Ile Gln Lys Leu Gln His Leu																																																																																					
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gct gtt gtt ttg ctc gga aat gaa cat tgt gat aat gag tgg ata aac	740																																																																																				
Ala Val Val Leu Leu Gly Asn Glu His Cys Asp Asn Glu Trp Ile Asn																																																																																					
200	205	210		cca ttc ctc aaa aga aat gga ggc ttc gtg gag ctg ctt ttc ata ata	788	Pro Phe Leu Lys Arg Asn Gly Gly Phe Val Glu Leu Leu Phe Ile Ile		215	220	225		tat gac agc ccc tgg att aat gac gtg gat gtt ttt cag tgg cct tta	836	Tyr Asp Ser Pro Trp Ile Asn Asp Val Asp Val Phe Gln Trp Pro Leu		230	235	240		gga gta gca aca tac agg aat ttt cct gtg gtg gag gca agt tgg tca	884	Gly Val Ala Thr Tyr Arg Asn Phe Pro Val Val Glu Ala Ser Trp Ser		245	250	255	260	atg ctg cat gat gag agg cca tat tta tgt aat ttc tta gga acg att	932	Met Leu His Asp Glu Arg Pro Tyr Leu Cys Asn Phe Leu Gly Thr Ile		265	270	275		tat gaa aat tca tcc aga cag gca cta atg aac att ttg aaa aaa gat	980	Tyr Glu Asn Ser Ser Arg Gln Ala Leu Met Asn Ile Leu Lys Lys Asp		280	285	290		ggg aac gat aag ctt tgt tgg gtt tca gca aga gaa cac tgg cag cct	1028	Gly Asn Asp Lys Leu Cys Trp Val Ser Ala Arg Glu His Trp Gln Pro		295	300	305		cag gaa aca aat gaa agt ctt aag aat tac caa gat gcc ttg ctt cag	1076																																
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atg ctg cat gat gag agg cca tat tta tgt aat ttc tta gga acg att	932																																																																																				
Met Leu His Asp Glu Arg Pro Tyr Leu Cys Asn Phe Leu Gly Thr Ile																																																																																					
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17/17

Gln Glu Thr Asn Glu Ser Leu Lys Asn Tyr Gln Asp Ala Leu Leu Gln			
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Ser Asp Leu Thr Leu Cys Pro Val Gly Val Asn Thr Glu Cys Tyr Arg			
325	330	335	340
atc tat gag gct tgc tcc tat ggc tcc att cct gtg gtg gaa gac gtg			1172
Ile Tyr Glu Ala Cys Ser Tyr Gly Ser Ile Pro Val Val Glu Asp Val			
345	350	355	
atg aca gct ggc aac tgt ggg aat aca tct gtg cac cac ggt gct cct			1220
Met Thr Ala Gly Asn Cys Gly Asn Thr Ser Val His His Gly Ala Pro			
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ctg cag tta ctc aag tcc atg ggt gct ccc ttt atc ttt atc aag aac			1268
Leu Gln Leu Leu Lys Ser Met Gly Ala Pro Phe Ile Phe Ile Lys Asn			
375	380	385	
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Trp Lys Glu Leu Pro Ala Val Leu Glu Lys Glu Lys Thr Ile Ile Leu			
390	395	400	
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Gln Glu Lys Ile Glu Arg Arg Lys Met Leu Leu Gln Trp Tyr Gln His			
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ttc aag aca gag ctt aaa atg aaa ttt act aat att tta gaa agc tca			1412
Phe Lys Thr Glu Leu Lys Met Lys Phe Thr Asn Ile Leu Glu Ser Ser			
425	430	435	
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Phe Leu Met Asn Asn Lys Ser			
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